

## UNIPLEX FRX 44-94S Non-Halogen Flame Retardant

**Description:** A white, thermally-stable non-halogen flame retardant particularly useful in polyolefin and polyurethane applications.

### Applications:

#### Resin Applications

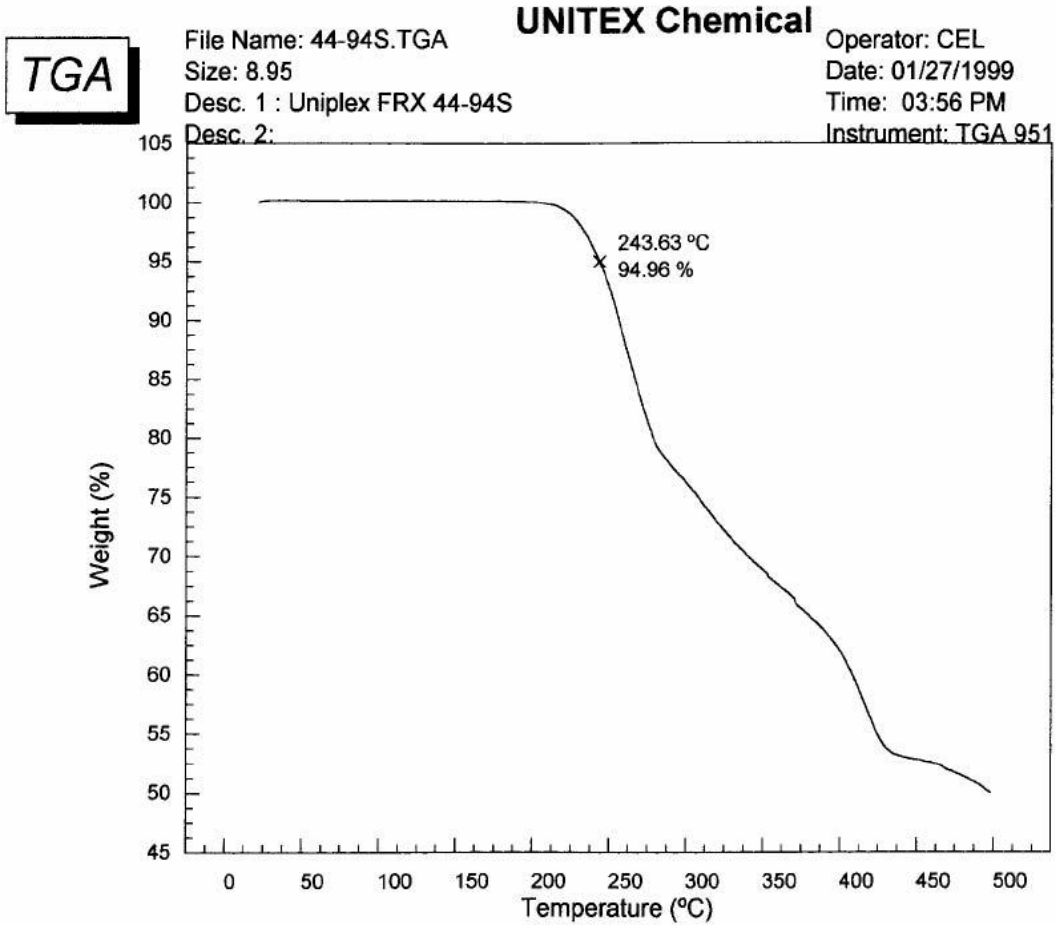
Polypropylene Battery cases, electronic housings  
Polyethylene Wire & Cable, molded parts  
Polyurethane Flexible Foam, Paint & Coatings

**Features:** White Powder  
Thermally-stable to 225°C  
Small Particle Size (< 5 micron)  
Excellent UV stability  
Non-hydroscopic  
Excellent acid stability to mineral acids

### Typical Properties:

Appearance White Powder  
Density 0.33 g/cm<sup>3</sup>  
Melting Point 254°C  
Flash Point > 680°F  
Water Content 0.15% max  
Phosphorus Content 15.67%  
Nitrogen Content 27.0%

**THERMOGRAVIMETRIC ANALYSIS:**



Instrument Specialists, Inc. Version 3.0

**Application Data:  
Low Density Polyethylene (LDPE) Formulation**

<b>Component</b>	<b>Wt %</b>	<b>Wt %</b>	<b>Wt %</b>
LDPE (MFI=7)	100	59.5	69.5
Uniplex FRX 44-94S	----	40	30
Antioxidant	----	0.25	0.25
Dispersant	----	0.25	0.25

**Low Density Polyethylene Properties**

UL94 (1/8 inch)	No Rating	V-0	V-0
UL94 (1/16 inch)	No Rating	V-0	V-0
%Elongation	196	92	104
Tensile Strength at Yield	1090	1088	1095
Tensile Strength at Break	1415	1096	1210
Izod Impact (1/8 inch) (ft-lbs/in)	2.7	2.4	2.55

**Ethylene-Vinyl Acetate (18%VA) Formulation**

<b>Component</b>	<b>Wt %</b>	<b>Wt %</b>	<b>Wt %</b>
Dupont Elvax 450 (MFI=8)	100	64.5	69.5
Uniplex FRX 44-94S	----	35	30
Antioxidant	----	0.25	0.25
Dispersant	----	0.25	0.25

### Ethylene-Vinyl Acetate Properties

UL94 (1/8 inch)	No Rating	V-0	V-2
UL94 (1/16 inch)	No Rating	V-0	V-2
%Elongation	680	204	220
Tensile Strength at Yield (psi)	690	755	728
Tensile Strength at Break (psi)	935	785	810
Izod Impact (1/8 inch) (ft-lbs/in)	1.6	2.9	2.8

### High Density Polyethylene (HDPE) Formulation

Component	Wt %	Wt %	Wt %
HDPE (MFI=5)	100	64.5	69.5
Uniplex FRX 44-94S	----	35	30
Antioxidant	----	0.25	0.25
Dispersant	----	0.25	0.25

### High Density Polyethylene Properties

UL94 (1/8 inch)	No Rating	V-0	V-0
UL94 (1/16 inch)	No Rating	V-2	V-2
%Elongation	800	144	180
Tensile Strength at Yield (psi)	2540	2100	2240
Tensile Strength at Break (psi)	1840	1396	1450
Izod Impact (1/8 inch) (ft-lbs/in)	1.2	0.86	1.02

## High Density Polyethylene (HDPE) Formulation

Component	Wt %	Wt %	Wt %
HDPE (MFI=10)	100	64.5	69.5
Uniplex FRX 44-94S	----	35	30
Antioxidant	----	0.25	0.25
Dispersant	----	0.25	0.25

## High Density Polyethylene Properties

UL94 (1/8 inch)	No Rating	V-0	V-0
UL94 (1/16 inch)	No Rating	V-2	V-2
%Elongation	980	80	108
Tensile Strength at Yield (psi)	3040	2496	2920
Tensile Strength at Break (psi)	1680	2410	2860
Izod Impact (1/8 inch) (ft-lbs/in)	0.98	1.05	1.07

## Polypropylene Co-Polymer (2.5% Ethylene Content) Formulation

Component	Wt %	Wt %	Wt %
PP (MFI=8)	100	64.5	69.5
Uniplex FRX 44-94S	---	35	30
Antioxidant	---	0.25	0.25
Dispersant	---	0.25	0.25

### Polypropylene Copolymer Properties

UL94 (1/8 inch)	No Rating	V-0	V-0
UL94 (1/16 inch)	No Rating	V-0	V-0
%Elongation	60	100	200
Tensile Strength at Yield (psi)	4800	5200	4950
Tensile Strength at Break (psi)	2300	2800	2650
Izod Impact (1/8 inch) (ft-lbs/in)	1.1	0.98	1.2

### Loading in Polypropylene (MFI=12) Versus Limiting Oxygen Index (LOI)

Weight% FR	0	25	30	35	40
L.O.I.	18	32	34	37	42

### Loading in Polypropylene Versus UL-94 Rating

Polymer MFI	UL94 V-2			UL94 V-0		
	1/8"	1/16"	1/32"	1/8"	1/16"	1/32"
2				<25	30	
4				<25	30	
12	15	20	25	25	30	40
35	<25	<25		25	35	

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